Mathware & Soft Computing

The magazine of the European Society for Fuzzy Logic and Technology

Interview: with Prof. Dr. Claudio Moraga
by Rudolf Seising

20 years of IRAFM - University of Ostrava

Conference reports

News and calls

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EUSFLAT
EUROPEAN SOCIETY FOR FUZZY LOGIC AND TECHNOLOGY

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Message from the Editor-in-Chief (December 2016)

HUMBERTO BUSTINCE

Dear EUSFLAT members,

This 2016 is finishing, and it is time for the new issue of the Mathware&Soft Computing online magazine to appear. And to open it, we have an extremely interesting interview between Claudio Moraga, taking advantage from the celebrations and hommages around Prof. Moraga's 80th birthday. It is not so common to have the opportunity of sharing the views of such a distinguished researcher, and I have no doubt all of us will deeply enjoy this talk. And, by the way, let me join in these lines to the congratulations to Prof. Moraga.

Furthermore, in this issue we also have the chance of finding some personal view of another giant of our community, since, precisely due to Prof. Moraga's birthday, Enric Trillas has written a letter to him. And I would like to take advantage of this fact to recall to all the members of our community that the pages of the magazine are open to the opinions and ideas of all of us. Science is done, among many other things, through continuous discussion of ideas, and I am sure that the Mathware&Soft Computing online magazine can be a perfect vehicle for such a discussion, which will make our community richer.

This issue also includes another joyful anniversary: It's 20 years since the creation of the Institute for Research and Applications of Fuzzy Modeling of the University of Ostrava, and, of course, here it is. All of us know about the great activity the IRAFM displays, with the solid support of its very high quality research in fuzzy theory and its applications. Happy birthday, too, for IRAFM!!

And, of course, many conferences of interest for our community have been held during the last months. Reports on some of them can be found in the issue you have in your hands. And, once again, let me encourage you to submit reports and information on any scientific activity which can be of interest for the community. All of them are always welcome! And, not to be forgotten, news, calls, reports on Ph.D.thesis... Our magazine again brings you whatever you have considered to be of interest for the community, and many, many interesting things are done by our readers!!

So, let this new issue be our felicitation for the New Year to come, which I hope will be full of happiness and successes. Happy New Year 2017 and happy new Mathware&Soft Computing issue, too!

Humberto Bustince
Editor-in-chief

Message from the President (December 2016)

GABRIELLA PASI

Dear EUSFLAT members,

time passes quickly, and also this year is coming to an end. 2016 has constituted another fruitful year for our Association, in terms of both events and collaborations with other Societies.

The EUSFLAT Summer School in Fuzzy Logic and Applications launched in Italy in 2015 is continuing successfully: the second SFLA school has taken place in Čeladná, Beskydy mountains, Czech Republic on August 14-19, 2016, and it was organized by the Institute for Research and Applications of Fuzzy Modeling, University of Ostrava (Czech Republic). The event has been supported by a grant of the Visegrad Fund. The school has been very successful and it has hosted several students from many countries; the lectures were thaught by internationally recognized experts. People have enjoyed both the scientific quality and the several events organized during the School. In particular, I would like to express my gratitude to Martin Stepnicka, who has worked very hard to ensure a high quality event. Many thanks to Martin and the entire organizing team!

In 2017 the third European Summer School on Fuzzy Logic and Applications (SFLA2017) will take place in Santiago de Compostela (Spain), from July 17 to July 21, 2017. The school will consist of several courses centered on core aspects and recent developments of Fuzzy Logic and related applications, including two sessions *inside-the-lab*. Also in this School lecturers will be world-leading experts. A key aspect will be the interaction between the lecturers and students. And for the first time at SFLA, the best student presentation will be awarded. As usual EUSFLAT will provide student grants to support PhD students in attending the School. I encourage both Phd student and young researchers to attend numerous this event that will take place in a beautiful historical city and will be for sure very stimulating as it will offer the opportunity of sharing your research work with experienced researchers. Many thanks to Jose Maria Alonso for the attention he is devoting to the organization of the school. Here the link to the Web Site of the School: `https://eventos.citius.usc.es/sfla2017`.

In 2017 there will be another very important event: the 11th Conference of the European Society for Fuzzy Logic and Technology (2017 EUSFLAT Conference), which will take place in the very heart of Warsaw, the capital of Poland, from September 11th to September 15th, under the organization of the Systems Research Institute of the Polish Academy of Sciences. The main aim of the EUSFLAT conference is to provide a context for the exchange of ideas among scientists, engineers and students. Several proposals of special session have already been submitted, and the leaders of the EUSFLAT Working Groups have been encouraged to submit proposals for special sessions; I take this opportunity to encourage those who have not responded yet to do that as soon as possible, by directly contacting the conference organizers using the following e-mail address: eusflat2017@ibspan.waw.pl. Please notice that paper submission phase has already been opened, with deadline on March 31st, 2017. The registration will be opened soon. Several special events and celebrations are planned at the conference, including the conferral of various awards. I remind you that the EUSFLAT conference supports some student grants (rules for applicants can be found at: `http://www.eusflat.org/members_grants.php`), the Best Student Paper award, and the EUSFLAT Best Ph.D. Thesis award (rules for applicants can be found at: `http://www.eusflat.org/awards.php`). Last but not least I would like to remember that during the conference the General Assembly will take place, and the new President and board will be elected. For all the above reasons I strongly recommend a numerous and active participation of EUSFLAT members: please come to Warsaw! I thank very much the organizers for the valuable work they are undertaking. You can reach the conference Web site at this link: `http://www.eusflat2017.ibspan.waw.pl/`.

In relation to the scientific activities promoted by EUSFLAT, I would like to outline the valuable role played by the EUSFLAT Working Groups (many thanks to Slawomir Zadrozny who in the Board is supporting them). The activities of Working Groups are extremely important to promote the research and the collaborations within our scientific community. Please check the list of Working Groups on the EUSFLAT Website, and join those within which you could contribute (`http://www.eusflat.org/research_workinggroups.php`).

Concerning the relation with other Societies I remind to the EUSFLAT members that they can apply to the IFSA Award: guidelines can be found at `http://isdlab.ie.ntnu.edu.tw/ntust/ifsa/pages/Operatingguidelines.html`.

In my letter of June 2016 I congratulated one of our distinguished members, Janusz Kacprzyk, for being elected a Member of the European Academy of Sciences and Arts, one of the largest pan-European academies of sciences, with about 1700 scientists, including Nobel Prize winners. This time I congratulate Janusz for receiving the 2016 Individual Award for Outstanding Contributions in the Field of Computational Intelligence, from the International Neural Network Society, Indian Chapter (INNS - India), and for having been granted the degree of the Doctor Honoris Causa of the Óbuda University in Budapest.

Finally, as usual I thank Humberto Bustince and his team for their valuable work to maintain our magazine updated

and appealing. And I also want to thank all the other colleagues and friends of the EUSFLAT Board for their invaluable support, as well as to all EUSFLAT members for making the Society alive!

I close this letter by wishing all of you and your families a Merry Christmas and a Joyful and Healthy New Year, where our Society can expand and offer more and more opportunities to collaborate.

Warm wishes,

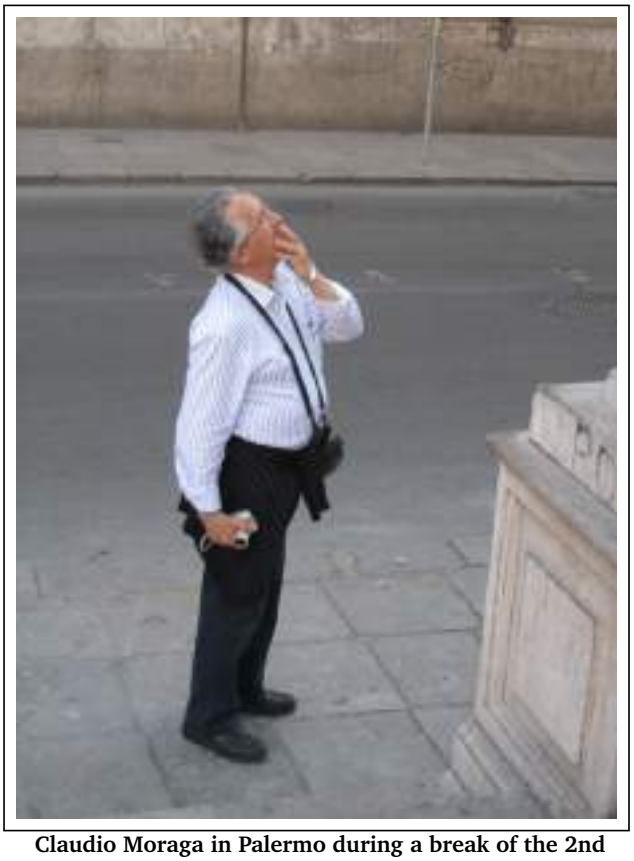
Gabriella Pasi
President of EUSFLAT

INTERVIEW

Interview with Prof. Dr. Claudio Moraga at TU Dortmund, November 3, 2016

Rudolf Seising

RUDOLF SEISING: Bereit? We should change to English.
CLAUDIO MORAGA: Schieβlos!



Claudio Moraga in Palermo during a break of the 2nd Saturday's Scientific Conversations, May 14 2011.

R.S.: You turned 80 some days ago and we know each other for about 10 % of this time. Congratulations to your birthday, Claudio!
C.M.: Thank you!
R.S.: 80 years ago, you were born in Chile. Please, can you tell us about your first years in this country and about your education?
C.M.: From the first years, I don't remember much, you know. My father was teacher at a High School and since I was the son of a teacher I had a scholarship to study in this private school. This was a kind of a privilege because the state education was not very good. The private school was good but expensive, so I could study in a High School all my school age.
R.S.: When did you start these studies?
C.M.: 1944 I entered the third class and 1953 I obtained my High School diploma.
R.S.: I think that you started studies in Electrical Engineering. Is that right?
C. M.: No, I started studying Architecture.
R.S.: Architecture!?
C.M.: It was rather a funny situation because I very much liked mathematics. But to study mathematics at that time in Chile, in the city where I lived, the only possibility was to study mathematics to become a teacher for mathematics in school. And the last thing that I wanted to do at that time was to be a teacher. Particularly for the small children.

I just wanted to study pure mathematics but this was not possible. There was no programme on pure Mathematics; there was just the program for education in mathematics. Then I had to start looking for other things and I was good for drawing. So, finally I started studying architecture.
R.S.: I think the city was Valparaiso. Is that right?
C.M.: That is the city, Valparaiso.
RS: Why did you have this love to mathematics? Did you have some idols in science in that time?
C.M.: No, I just had some facilities for mathematics. I liked it and enjoyed solving problems, I liked geometry, Euclidean geometry, I didn't know anything about Riemannian geometry. I wanted to continue studying mathematics just for fun! I would say. Well, if Pythagoras just did it why couldn't I do the same?
R.S.: Yes, why not? - Then, in August 1961 you earned the Bachelor's degree and in September 1962 you got your Master's degree, but you got these degrees in Electrical Engineering. When did you change and why?
C.M.: I changed after, let's say, according to the German system I had the "Vordiplom" in Architecture and in those times, there was a particular change at this School of Architecture where I was studying. There came people that said: "Architecture is the "forgotten art"!" And they put a very striking example, they said: Ask your friends to tell you about ten famous writers, they will tell you. Ask them to tell ten good musicians, they will give you. Tell them to name ten painters, they will have some difficulties. Ask them to name five sculptors and they will have even more difficulties. Ask them to tell you three architects and they will never be able to do that. That was in a strike. And they changed the whole system. The design courses became the most important courses. In a way, they were meant to discover whether you would be an "artist" or not. I passed all mathematics without exams. If I had a good mark I didn't have to go to the finals. But then, in this design part where you were supposed to be a potential artist, I realized that I could see "no light at the end of the tunnel". Finally I said "No, that is not for me". And then I changed to Electronics.
R.S.: And why Electronics?
C.M.: There was a new School of Electronics at the same University and it was something new then in Chile. Moreover they were looking for students. I knew some other class-

mates of mine who would change, too. I decided to see what would happen.

Claudio Moraga at his "Graduation Day" at MIT, Cambridge, USA, 1962.

R.S.: In your Bachelor's and your Master's degree what kind of research did you do?

C.M.: For the master's degree I had to build an equipment to control a flashing system. The professor was interested in measuring reactions of - let's say of the brain - according to different kind of sequences of flashing and I had to build the equipment to produce the driving pulses for the flashing system.

R.S.: Already in this time you were interested in Neural networks!

C.M.: Neural networks as such, I think, did not exist, actually.

R.S.: Artificial neural networks...

C.M.: Yes, of course, artificial ... well, Rosenblatt had already made the Perceptron about that time, but Minsky said no. And it did take over 25 years until the "rebirth" of the subject with the works of David Rumelhart and James McClelland.

R.S.: Did you know these works already in that time?

C.M.: No, I had no idea of that.

R.S.: Then, you did your Ph. D. studies in Chile, what was the subject of your Ph. D. thesis?

C.M.: Non-binary digital systems.

R.S.: Multivalued logic already!

C.M.: Yes, that was the beginning of Multi-valued logic, actually. Three-valued was already difficult enough but I did some circuits with three values. My thesis was a kind of book for switching theory... for ternary systems, so combinational system, minimization of expressions, sequential circuits; typical subjects of basic switching theory.

R.S.: This was not very common in that time, non-binary switches.

C.M.: No, it was very funny, I think I was the only one in the southern hemisphere working on ternary systems on that time.

R.S.: So, how did you come to this kind of subject?

C.M.: I was lucky that my advisor said: Well, you know, why don't you try ternary systems? I was good in digital systems. Why don't you consider that as a subject? Then I started reading and I was thinking, "Well, I will do it!"

Claudio Moraga in front of his "library" (= shelft with books) of the small department for Electronics of the Catholic University of Valparaíso, Chile, where he had become director (about 1968).

R.S.: So, you were interested in multi-valued logic in that time already? You knew Łukasiewicz [1], Kleene [2], ...

C.M.: No, I had no idea of anything of that. When I started with that I thought it was personal and something new. And for a Ph. D. thesis it had to be something new, So, that was interesting; it was challenging because there were a lot of open problems. All problems were open. At least for me at that time. Then I started reading and searching for literature; there was not much available at the library. We had no internet, we had no Google. So there was no possibility to know what the others were doing.

[1] Jan Łukasiewicz (1878-1956) was a Polish philosopher, logician and mathematician. He is a pioneer investigator of multi-valued logics. He introduced his three-valued propositional calculus in the year 1917 as the first explicitly axiomatized non-classical logical calculus.

[2] Stephen Cole Kleene (1909-1946) was an US-American logician. He is the founder of the so-called recursion theory.

R.S.: So you read Kleene or what kind of multivalued logic literature you knew in that time?
C.M.: I guess, I started with my own ideas how to do that and I came to the triple-valued maximum and minimum and multiple values. And then I found contact with some people in the states and that were researching decisions in multi-valued logic conferences. I was lucky to attend the first one and then I knew what the others were doing and then I looked for the others literature. Then I knew the different algebras that were available and why they were used to this or the other problem so, that did help quite a lot.
R.S.: Do you remember when was this first conference and where?
C.M.: It was in 71 in Buffalo [3].
R.S.: You had got already funding for travelling?
C.M.: Yes, from the university. It allowed me to travel to that conference.
R.S.: I guess that in this year 71 you have not been familiar with Fuzzy Logic in that time?
C.M.: No, not at all.
R.S.: There was nobody giving talks on Fuzzy Logic in this conference?
C.M.: No, I think that at that time in Chile there was no one working on Fuzzy Logic. That started much later.
R.S.: After your Ph.D. you had a kind of scientific and administrative career in Chile?
C.M.: Well, first of all I became a professor at the university where I made my Ph. D.[4]. Later, I was a Dean of Electrical Engineering and finally I was Vice-rector.
R.S.: That was a fast career in that time, isn't it?
C.M.: Yes, it was fast career but it was easy: there were no other candidates!
R.S.: In 1973 you left Chile. Can you tell us something about these circumstances?

Claudio Moraga, then Academic Prorector of the Technical University Federico Santa María, Valparaíso, Chile chairing at a meeting on research and development of universities of the region of Valparaíso, October/November 1972 at the Technical University.

C.M.: Well, I was lucky that the Alexander-von-Humboldt-Stiftung[5] from Germany provided me with a research stay in Germany at the right time because the military dictatorship started in Chile in those years.
R.S.: It was because of the military dictatorship after Allende?[6] That was the reason why you left Chile?
C.M.: Yes, also.
R.S.: First, you wanted to go to England?
C.M.: Well actually all the contacts that I had were people in the United States because of the conference that I had been attending. I could speak English but I didn't know a single word of German. Usually you get a scholarship, a fellowship etc. for one, maybe two years. That's it! At that time my older son was already going to school and for the situation in Chile the state education was not good enough. Private education was better. There was the German school which was supported by the German government. And it had low fees so we could afford that. For this reason, my son was attending education in this German school. We told them that my wife and I didn't speak a single word of German and they said that this was not a problem. About one half of the children attending the school had parents that did not speak German. So my son started there learning the language. It seems that he was learning fast because there were courses for children who could speak German and courses for children who were learning. And my son was moved for the mathematic courses to the German group. So he learned the "1+1" in German, not in Spanish.

Then going to the States or Canada for one year, may be two, it would not be long enough for him to learn English but it would be long enough to have a mixture of English and German so he would lose more than winning.

Then it became clear that we, my wife and I, had to learn German and try to come to Germany. And I was right: we looked for and found the Alexander-von-Humboldt-Foundation...and they found us. This is how and why we came to Germany and not to some English-speaking country.
R.S.: Professor Reusch was involved in this changing[7].
C.M.: Yes, because if you have an invitation from the Foundation, you need some host who is willing to accept you, and he was willing to take the risk of having me as a guest.
R.S.: Was there somebody else? I think that you all three met in a conference in Israel? Who was this third person involved?
C.M.: We met at a conference in Israel. The third person involved was Zvi Kohavi[8], one of the professors at the Technion[9]. He was one of the organizers of this conference where I happened to attend and Professor Reusch was also attending this conference and we met there some time but there were over 300 people. I knew, when I received the possibility from the Humblodt-Foundation to come to Germany, I had to look for a host and I had no contact to Germans,

[3] See: Proceedings of the 1971 symposium on Multi-valued Logic Design, University of New York at Buffalo, New York.
[4] Ph.D. in E.E. at the Technical University "Federico Santa Maria" (UTFSM), Valparaiso, Chile.
[5] The Alexander von Humboldt Foundation (Alexander von Humboldt-Stiftung) was established by the government of the Federal Republic of Germany with grants every year about 700 awards and research fellowships.
[6] Salvador Guillermo Allende Gossens (1908-1973) was a Chilean physician and politician in the socialist party for almost 40 years. In 1970, he became president. On 11 September 1973, the military overthrew Allende's government in a coup. At the same day he shot himself.
[7] Bernd Reusch is professor emeritus at the department of Computer Science of the Dortmund Technical University.
[8] Zvi Kohavi (born 1935), and he was professor of at the department of Electrical Engineering of the Technion, in Haifa, Israel. Recently he is Sir Michael and Lady Sobell Chair in Computer Engineering and Electronics.
[9] Technion - Israel Institute of Technology is the Technical University of Israel in Haifa.

But I knew that the people from the Technion, they had contacts in Germany, so I asked Kohavi: "I have this possibility to going to Germany. Do you know someone that would willing to accept me as a guest?" Kohavi said: "Well, there is a new university in Dortmund," - the university was four years old when I came, the department was two years old when I came, and he said: "There is a professor that is now one of the founding professors of the department of Computer Science and he was here. We met drinking beer at one of the breaks of the conference. So, why don't you ask him?" So, I wrote a letter to Professor Reusch: "May be you remember that we were drinking beer with Kohavi in this conference. I have a possibility to some research stay, will you be willing to take me with your group?"

Annual meeting of the members of the professorship Computer Science (Informatik I) of the Dortmund Technical University in "Haus Ahlenberg", Herdecke, Germany, 1978.

R.S.: And he did?

C.M.: Yes! He said "Ok, come!" - The department was starting. Having one curious person there that would be doing strange things that nobody else was doing, (ternary digital systems), working for free, since a Foundation would be supporting me, made easy to take the risk of saying "Yes".

R.S.: What kind of scientific project you started here in Dortmund?

C.M.: Ternary systems - that was the only thing I knew; it was right after my Ph. D. work and I had been designing circuits working on that. So I told Professor Reusch that I was working on that. He said "Nobody is working on ternary systems here but you will have the opportunity to explain why did you start this work". That's what I did.

R.S.: In these times, Professor Reusch didn't organize the "Fuzzy Days"[10] already?

C.M.: Not yet. He started much later with that.

R.S.: That was the first time you came in touch with that?

C.M.: No, I think it was the other way around. I met Professor Zadeh at a conference, one of these Multivalued Logic conferences while he was attending as a regular contributor to that conference and, well, I thought it was interesting but it was totally far from what I was doing. I was doing crisp things on hardware and not doing work on Fuzzy Logic. But I thought it was interesting. And we had good contact with Professor Zadeh. You know him, it is very easy to get acquainted with him. We had nice talks even though we were working on different areas.

I met him again on several other conferences and I was lucky to be chair of a conference where he was an invited speaker at the 30th anniversary of his original paper[11].

I think that in the meantime I changed to the University of Bremen. I was one and a half year there, and when I returned to Dortmund I started here [at the Technical University of Dortmund] a seminar on Fuzzy Sets. I think that short after that Professor Reusch started with the Fuzzy Days. For one point I remember that he was talking with the other professors, saying, "See, this is an interesting thing, Fuzzy Logic". He had been reading papers of Lotfi and I heard him saying that it would be a good thing for the department to start working on that. "If no one else will, I will do it at my Chair, but motivating the people to do work that." And short after that he started with the Fuzzy Days-conferences.

R.S.: So, you started with studied Fuzzy Sets already in your time in Bremen?

C.M.: In Bremen, I think also I gave some seminars on Fuzzy Sets.

R.S.: Was this the first time of seminars on Fuzzy Sets in Germany?

C.M.: No, there were people already working with Fuzzy Sets or this kind of logics. Professor Thiele had been working with that quite longer [12].

R.S.: Let's go back to the times when you started in Dortmund the first time. I think it was in September 1976 when you became lecturer in Dortmund, right?

C.M.: No, I arrived in Dortmund in 74. And I was two years guest from the Foundation. But in 76 then I was guest of the University. So, I got my first assistant contract from the university.

R.S.: This was not a permanent position, right?

C.M.: No, that was not a permanent positon. But since the department was starting and the university was starting there were a lot of positions that were approved by the ministry but were not already occupied. So, they could borrow from these different positions for one year. And it was not difficult to give me this position.

R.S.: How long did you stay in this position in Dortmund before you moved to Bremen?

C.M.: Oh, quite long because finally they discovered that there was one legal possibility for giving me a permanent position. That was considered in the law of universities. If there is one particular task that requires continuity more than one year then it is possible to assign a permanent position. They asked me whether I was willing to create from scratches a laboratory for digital systems for the students in Computer Science. And since I had done that in Chile a couple of times, I said "Ok, I will do it." I had the unusually experience of becoming a lot of money that I had to spend up to the end of the calendar year. I couldn't keep the money for the following years when I could find equipment cheaper but I had to

[10] The Fuzzy Days, a series of international Conferences on Computational Intelligence, Theory and Applications, organized by Bernd Reuch in Dortmund that started in 1991. The last Fuzzy Days took place in the year 2004.

[11] 25th International Symposium on Multiple-Valued Logic, Logic, IEEE Computer Society, Indiana University, Bloomington, 1995.

[12] Helmut Thiele (1926-2003) was a German mathematician. He worked in mathematical logics and foundations of mathematics, theory of automata and algorithms, and Fuzzy logic.

buy anything on the first months. Between October and December of that year I had to spend a huge amount of money. - Quite unusual experience for me. I had to spend it until the end of the year, so I constructed this laboratory and I was then teaching circuit structures in this laboratory for several years. That's why and how I could have this position at this university.

R.S.: But then you changed to Bremen.

C.M.: Well, there was an opening in Bremen, I applied for the position and I got the position in Bremen. That was the first professor-position that I had in Germany.

R.S.: That was only one and a half year. Then you returned to Dortmund.

C.M.: Yes, because by the time that I was leaving to Bremen somebody had come to the Chair to have the second position besides Professor Reusch. Somebody obtained this position, but he moved to the university of Bonn the next year. The position was open for applications and since I already had a professor-position in Bremen, I was allowed to apply back to Dortmund. Otherwise it would not have been allowed by the law. You cannot move from assistant to professor at the same university.

R.S.: What followed now, was a very long period of life and work in Dortmund until I retired: 15 years?

C.M.: I came in 86 back form Bremen, I was in Dortmund until 2002 when I was retired.

R.S.: More than 15 years! Do you remember highlights? Ph. D. students? Colleagues? Collaborators? Projects? etc. What is the first that you remember?

C.M.: Well this is something natural: I had a position as a professor and I had one assistant. Usually the assistant will work on a dissertation. So I had a first "Ph.D. Student". He was a very good student and he made a very interesting hardware-oriented dissertation with me. In those years, we devoted much emphasis on so-called Project-groups. It was a very unique kind of an education system here in Dortmund. I think it was the only university that had this one. In Bremen, they had something similar but it was not concentrated in one year. The idea in Bremen was to organize all additional courses around what is related to the project. So, the idea was pretty good, but it was difficult to realize. In Dortmund it was one subject for one year with one professor with one or two assistants working together with some twelve students and I conducted several projects-groups in the early years. Project-groups were very work-intensive. We were full time so we would lead a project and teach one course.

For research: Probably among the most important things was at the change of the century, the beginning of the 2000s. After the spitting situation in Yugoslavia. The DAAD the German Academic Exchange Service organized a program called "Stability Pact for South-East Europe" and then it was possible, again probably, to have joint projects between regions of the Balkan and Germany. And I applied for one of those with Prof. Stankovic from Serbia. The DAAD accepted that and the subject was something like Intelligent systems for information technology in Serbia. We organized several workshops, conferences and probably the most important thing: we organized summer schools for students of the Balkan region, not only from Serbia. We had students from Serbia, from Croacia, from Macedonia, from Bosnia, from Bulgaria, from Romania and from Greece. I think three years in a row and the DAAD would pay for the stay, accomodation and the trip of the students from the different regions to Serbia and they would stay one up to two weeks. We were lecturing on the different aspects of intelligent systems. Even some professors of other universities came freewilling to lecture and participate in this educational experiment in Serbia. That was a very interesting experience! Well, after that I was asked to work on several TEMPUS project in Serbia and Macedonia.

Claudio Moraga and Rudolf Seising who presented the Festschrift for Claudio Moraga during the celebration of his 80th birthday in Dortmund, November 4, 2016.

R.S.: Is there something that you want to mention in relation to Fuzzy Sets and Neural networks? What kind of research was it in that time for you?

C.M.: Well, I did some things on Neural networks and then I started to mixture of Fuzzy and Neural networks. Interesting was that we didn't know, or I didn't know that Roger Jang was writing a Ph. D. with Lotfi Zadeh on Fuzzy and Neural Networks together[13]. And there was a group in France that was doing similar things and I was trying to do similar things that he had done. But Roger Jang won because he was the first in finishing the system of publishing that and it was too late to do anything similar to that, but we used them and we applied it in different cases.

And then it started to become interested in Evolutionary Algorithms and combining all these things which came out with Soft Computing or Computational Intelligence after a few years.

R.S.: You retired in February 2002. However, you continued working in science and then you became a Visiting Professor in the Department of Artificial Intelligence at the Technical University of Madrid in Spain.

C.M.: Yes, one year I had a visiting position there.

R.S.: Can you comment this connection? What was the reason to go to Spain? Who invited you?

C.M.: Professor Enric Trillas with whom I had good friendship. I had met in the 80s and we had been always in touch and he eventually invited me whenever he organized a seminar. Then there was a program from some of the ministries

[13] Jyh-Shing Roger Jang received his Ph.D. from the EECS Department at the University of California, Berkeley. He studied fuzzy logic and artificial neural networks with Prof. Lotfi Zadeh. He was a professor in the CS Dept. of National Tsing Hua Univ., Taiwan, from 1995 to 2012. Since August 2012, he has been a professor in the CSIE Dept. of National Taiwan Univ., Taiwan.

that they would offer a kind of sabatic. Professor Trillas, at that time at the Technical University of Madrid, knew about this program and he asked whether he could invite somebody from Germany to spend a sabatic while visiting for one year and immediately they said "Yes". This is how I was invited to Madrid and in one year I was "fuzzyfied" by Professor Trillas and his group.

Enric Trillas, Settimo Termini and Claudio Moraga at the 2nd Saturday's Scientific Conversations "Thinking and Fuzzy Logic" in Palermo (Sicily Italy) 14th of May 2011.

R.S.: How long do you know professor Trillas already? When did you meet him for the first time?

C.M.: I think I met him at the Multiple-valued conference in Illinois in the States in 1980 (something like that)[14]. He had been working with some students oriented to Fuzzy things, and one of the students, one girl, she was interested in ternary hardware. I knew that she was doing things for that. And then he went with these two girls to that conference to give them the opportunity to meet there all people working in similar areas and then at one coffee break we met. It was unexpected, in those years, to have some Spanish speaking people at those conferences. I thought I was the only one. So, I met him and he was glad to meet someone else speaking Spanish, although, maybe he would have loved speaking Catalan - He is Catalan. So, we met there and we talked quite a lot and he then invited me: "Why don't you come to Barcelona and explain us what you are doing?" I thought it was one of those things that you always say in these kind of talks, but then short after that I received a call from his secretary asking whether I could come to Barcelona and give a talk at a seminar. And that was the beginning of our very intensive contact.

Enric Trillas and Claudio Moraga.

R.S.: After that you became Professor ad honorem in Dortmund and you still collaborated with many people in many countries.

C.M.: Well, mainly with the series of TEMPUS projects in Serbia and Macedonia and on the other side I kept contact with my former students and now colleagues in Chile because after the end of the dictatorship in Chile programs of academic exchange between Germany and Chile that had been stopped during the dictatorship were reactivated and the Ministry of Education and Research in Germany invited to submit proposals for joint research with people in Chile. I called up my former students, now colleagues, and we presented one project on Intelligent systems, that was immediately accepted. Both the Ministry for Education and research of Germany and the National Commission for Research in Chile took part contributing to the financial support to the project. And that's how I started again working with colleagues in Chile.

R.S.: I remember at least two other persons, one from Algeria and one from Georgia.

C.M.: Yes, the one from Algeria, she, - it's a lady, - she wanted do to something on Evolutionary systems applied to the design of digital systems.

Claudio Moraga, Fatima Z. Hadjam and Enric Tillas at the I. International Symposium Fuzziness, Philosophy and Medicine at the ECSC in Mieres (Spain), March 2011.

R.S.: That is Fatima Hadjam.

C.M.: That is Fatima Hadjam, that was in 2007. But somehow she wanted to do her Ph. D. in this area, but the profes-

[14] Tenth International Symposium on Multiple-Valued Logic, Northwestern University, Evanston, 1980. Proc.: Long Beach, CA.: IEEE Computer Society Publications Office, 1980. http://www.worldcat.org/title/proceedings-the-tenth-international-symposium-on-multiple-valued-logic-northwestern-university-evanston-il/oclc/11009794

sor with whom she was working moved to another country and then she was alone. Well, through Internet I guess, she found some names and tried to contact these people working in similar areas and at this is how I received one letter of her that she was interested in work in this particular area. If I could send her papers or whatever. I told her, you know, the German Academic Exchange service had some short time visiting possibilities, why don't you apply for a short visiting period? Come here to Germany. Then I can provide you with whatever you may need for your Ph. D. and then you can go back to work at your university. It was lucky that she applied not for a short visiting but for a full scholarship from the DAAD. At that time the rector of her university in Algeria also supported this and allowed her to be one year here in Dortmund and contributed also with that scholarship. She could stay three semesters in Dortmund and then we advanced quite a lot. She was a hard worker and after that when she could return to Algeria, we continued via Internet connected; she could finish her Ph. D. actually already in Spain at the European Centre for Soft Computing. She came a month every year and was working there intensively with me until she finished her Ph. D. and we have continued to do work on that, now applied to reversible circuits.

Claudio Moraga, Fatima Z. Hadjam, and Igor Aizenberg at the conference dinner of IEEE WCCI-2010 in Barcelona, Spain, in July 2010.

R.S.: Was it similar with the other lady from Georgia, I forgot her name. She passed away.

C.M.: Yes, she passed away last year, it was Tatiana Kieseliova. She had been here at the chair, I don't know how she came but Professor Reusch accepted her as a guest, later she had some position as assistant for several years and she was very friendly and a hard worker. Also she tried to work with different people. She was working in Fuzzy things. After her residence here finished she returned to Georgia, to her home university to continue in that area but she got sick and unfortunately she passed away.

R.S.: I remember that. - In the year 2006 the Foundation for the Advancement of Soft Computing launched the European Centre for Soft Computing in Mieres in Asturias (Spain). You became as Emeritus Researcher the Head of the Research Unit "Fundamentals of Soft Computing". This was one of four research units. Do you remember the first time you heard about the plans to establish this centre?

Luis Arguelles, Ramon Lopez de Mantaras, Claudio Moraga, Alejandro Sobrino, Alberto Bugarin, and Enric Trillas at the Round table of the "Alfredo Deano Seminar on Ordinary Reasoning" in Gijón, Spain, April 29 2011.

C.M.: Well, let's say I knew this project of Enric Trillas much longer ago. He tried at different other places and it didn't work. It was a very lucky circumstance that lead to an agreement and finally it was decided to start the Centre in Asturias. Then he phoned me and he said: "Well, now it will be true, the centre will start here. We need you!"

R.S.: I remember that there was a letter by Lotfi Zadeh to the chancellor of Germany, Angela Merkel, to establish such a centre in Germany.

C.M.: Yes, also, I remember and I don't know whether it was true...

R.S.: Yes, it is, I saw this letter...

C.M.: No, that he talked to her, yes; but people say that he had told Frau Merkel: Charge one additional Euro in the taxes to every people and you have enough money to support a centre of this kind for the next ten years. At that time there were 80 Million people in West-Germany. So, 80 Million Euros. That could have been a lot of money to have no problems for 10 years. 8 million per year is more than the centre could spend. But she was not convinced of that...

R.S.: Maybe she never read this letter. Now, the European Centre for Soft Computing was launched in Mieres, in Asturias and I think that Enric Trillas was one of the driving persons...

C.M.: He was the man with the idea behind that and moved the creation of the centre. I was only the founding researcher, I was the first one in moving to Mieres.

R.S.: When did you decide to do this job?

C.M.: When he called me and said "We need you!" I said "Ok". In the next month, March 2006, I was the first one there.

R.S.: After 10 years, in December 2015, the ECS terminated. The center existed only 10 years. What is your opinion about the 10 years of the European Centre for Soft Computing in Mieres? Was it a success or not?

C.M.: On the one side it was unique project. A modern project for Spain and probably for Europe. A research centre where both fundamental and applied things were considered. Any centre that works on basic research cannot be self-supported. So, it has to be supported from external sources. If we compare it with the situation in Germany: In Ger-

many we have the Max-Planck-Society[15] with support from the Government. They are devoted to basic research. In parallel we have the Fraunhofer-Research-system[16], that work together with industry. They support themselves through projects with and for the industry, while the Max-Planck Institutes do not have priority in industrial projects. If they can, certainly they will do, but their main concern is fundamental science. They would be glad to have support from industry, but basically they have support from the Government to do basic research. That was not understood in the situation in Spain. Those who started with the support, at one point they said: "No, we don't give any longer support, you should support yourselves." I remember that I was asking: "Tell me who buys theorems, I will try to sell them some of my theorems." But no one. No one buys the theorems!

Claudio Moraga after the Ph. D. defense of his student Juan Zamora.

R.S.: You moved back to Germany and now you are here in Dortmund again. - or still! What are you doing now in science? What kind of research are you doing now?
C.M.: First of all I am a permanent stubborn guest at the university and particularly at the chair on Logic for Computer Science. I don't work on logic but I do a couple of different things, I continue working on properties of discrete functions. There are some new families of functions that interest me to do research on, so-called Bent functions which in the binary case they are important for cryptography, in the multiple-valued case they are not, since cryptography is basically binary. But in the multiple-valued case there are very challenging problems. Actually, a lot of mathematicians are working on that , because generating, characterizing, and counting Bent functions are very tough problems, in the non-binary world. So, I do a few things in that case. And now, with the latest new project of the European Community Reversible Computing I do something on reversible circuits. Reversible circuits have the property that if you give some inputs and calculate the outputs If you introduce the outputs you could recover the original inputs. This can be done on different levels, not only on the hardware level but at other levels on computing too. In the case of programs, for instance, you will start (back) with "end" until reaching "begin". This means that you are able to return in your program which is important, for instance, for testing and finding the errors in programs. You do step-by-step-returning and you can find out where something is out of order. The European Community has a project on that for three or four years long, trying to create a network of researchers interested and active in the subject. The network will allow people to exchange information and experiences. A conference on Reversible Computation is organized every year where the best results are presented.

All participants of the celebration of Claudio Moraga's 80th birthday in Dortmund, November 4, 2016.

R.S.: Thank you very much for this interview!
C.M.: You're welcome!

New book
Seising, Rudolf, Allende-Cid, Héctor (Eds.): Claudio Moraga: A Passion for Multi-Valued Logic and Soft Computing, (with a Foreword of Pablo Estevez), Springer International Publishing (Studies in Fuzziness and Soft Computing Vol. 349), 2017, pages: XIV, 382. ISBN: 978-3-319-48316-0

The book is an authoritative collection of contributions by leading experts on the topics of fuzzy logic, multi-valued logic and neural network. Originally written as an homage to Claudio Moraga, seen by his colleagues as an example of concentration, discipline and passion for science, the book also represents a timely reference guide for advance students and researchers in the field of soft computing, and multiple-valued logic.

[15]The Max Planck Society for the Advancement of Science (Max-Planck-Gesellschaft) is funded by the federal and state governments of Germany as a non-governmental and non-profit association of German research institutes. It was founded in 1911 as the Kaiser Wilhelm Society and renamed in 1948 in honor of its former president, theoretical physicist Max Planck.

[16]The Fraunhofer Society (Fraunhofer-Gesellschaft) for the Advancement of Applied Research, is a German research organization with 67 institutes spread throughout Germany, each focusing on different fields of applied science.

SCIENTIFIC REPORT

A letter to Claudio Moraga

Enric Trillas

Dear Claudio,

I am very sorry for my unexpected impossibility of being in Dortmund to attend the well deserved homage devoted to celebrate your eighty birthday. I deeply apologize for it, and this letter will try to substitute the lecture I should have been delivering in the ceremony.

I am joyous for being among those of your friends that did collaborate in the Homage's Book, and please, be sure that, even virtually and at a big distance, in this moment my remembrances are with you.

I plan to write shortly about some topics on which we have talked many times, sharing some views, along the more than thirty years of our marvelous friendship.

Since, at the university's level, teaching and research cannot be separated from each other, let me begin saying something on how a professor should appear at its students for better helping them to become, not only good citizens and good professionals, but also and in particular, as good as possible researchers.

First of all, professors should show 'knowledge', 'enthusiasm', and 'creativity'. Without the first, the professor is just an incompetent one, and without the second is simply boring. Without the third, the professor is unable to motivate its students towards clarifying what is still dark. In addition, and intermingled with these qualities, the professor should also show a good wish for helping its students to pose non trivial questions, and openness enough to help them finding non trivial answers; trivial answers are for nothing.

Both in life, and in Science, what is dark deserves questioning, and questions deserve answers. Paraphrasing Albert Einstein, a researcher should never stop questioning, but also paraphrasing the Nobel Laureate Isidor J. Rabi, the questions should be 'good' ones, those that, following Karl Menger, conduct to 'fertile' answers. The best scientific researchers always pose good and fertile questions; and no professor can be considered a researcher if, from time to time, she or he is not publishing something new and relevant.

For what concerns enthusiasm, it should be acquired very early and, at most, when preparing the Ph.D. Dissertation, or during the Post-doc period. These are times in which the young researcher should be acquainted with what greatest researchers did; it is never sufficient to know the last published papers, but also those works from which they derived, and the reflections made on the corresponding antecedents. The young researcher should know that his or her task is, at least in a part, an 'intellectual struggle' against all those that did contribute to the chosen Dissertation's subject. For it, I keep strong doubts on the current tendency of preparing the Dissertation inside a project of research that, obviously, comes from the thought of its Principal Researcher, and is with an ending date, but does not come from the candidate's thought. In my around fifty years of experience, I repeatedly have been seeing that it conducts to avoid the study of great works, but to just study last published papers. In any case, I doubt that the candidate can actually see the subject as its own since it is, up to some extent, an imposed one.

I strongly call for freedom in the selection of the dissertation subject; something of some difficulty in a time in which Principal Researchers need manpower for their externally financed projects, on whose money it hangs the 'survival' of the team; a time in which we face a, perhaps bad, change from wise professors to professors approaching managers. I am seeing all this with a deep sorrow; I am convinced that enthusiasm is mainly boosted by free choice.

Once I discharged myself from these worries, let me concentrate on the aspect concerning the creative capability a researcher should have. By paraphrasing Pablo Picasso, creativity is not transforming the sun in a yellow spot, but a yellow spot in the sun, and paraphrasing Stefan Zweig, human intellectual creativity is the last pending mystery. It is certainly a mystery, since it actually comes from breaking deductive reasoning, that it is seen as the pearl of reasoning, mainly after Euclide's 'Elements' did influence the last Middle-Age's philosophers. Deduction is strictly necessary for proving mathematical theorems; it is a powerful instrument for developing what is hidden in the corresponding axioms; but it is unable for reaching new and unexpected results. In the words of the Nobel Price Peter B. Medawar, 'No logical reasoning allows to extend the informational contents of the starting axioms, premises, or observational statements'. Creativity is necessary for it. Mathematicians, for instance and before trying to prove something, reason like people do, guessing with the help of analogy within their own experience, acquired in former, and more or less similar, situations. Paraphrasing Eugen Wigner, mathematicians start thinking on a new topic like a craftsman does, and they only try to prove something after guessing some idea on it. That the corpus of mathematics is constituted by deductively proven 'theorems' shows that mathematics is a formal science; if it can be influenced by practical problems, its 'corpus' is constituted by abstract statements able to be applied at a multitude of different real situations. This is what gives mathematics an enormous capability for being applied. Again with Wigner, it shows the 'unreasonable effectiveness of Mathematics in the Natural Sciences'.

Hence, and in short, creativity seems to be boosted by a type of reasoning very different from the formal reasoning of the mathematical proof. Even when in an ordinary conversation it is stated 'I deduce', it is often more proper to state 'I

induce'; very few times ordinary reasoning is formal deduction that requires to be done in a mathematical framework.

In formal deductive reasoning there are no jumps, it is conducted through chains of statements each one following from the former, and, provided the relationship 'follows' is presumed to be transitive, all step in the chain follows from the first, and no hole can exist between any two successive steps. This is something almost impossible to keep in most of the ordinary reasoning done by people; in mathematics, proof is conducted under an artificial language with precise terms whose uncertainty, if any, is managed by well and precisely defined measures like probabilities. But, when in real life, someone tries to prove something, it is usually done in a plain language full of imprecision, ambiguity, non-random uncertainty, and often enough just considering qualitative arguments. It is like in most philosophical writings, where almost all the involved concepts are not measurable but metaphysical; what is in these writings can be certainly suggestive, as it happened historically with several branches of Science that did arise from Philosophy, but, to move up to scientific knowledge both measurability, and some proving processes, are necessary. The difference between what is in the corpus of Physics and what is in that of Mathematics, consists in that the first, even if it is foreseen from a mathematical model, is only accepted as a true knowledge once checked against reality, the second when deductively proven. Physics is an experimental science, Mathematics is a formal one.

Creativity is certainly a mystery, and it is a truly pending one since, at least and for what concerns scientific progress, there is not a clear and systematic way for doing creative reasoning by means of computers, like the deductive one is done. Let me paraphrase the answer Bertrand Russell addressed to Herb Simon, when he announced to Russell that his AI's program 'Logical Theorist' did a shorter proof of a theorem in the Whitehead and Russell's 'Principia Mathematica': I always supposed a machine will do it better, and what is a pity is not having had the machine when we expended ten years doing it at hand.

But, how is a reasoning that can be qualified as 'creative'? Basically, it should contain jumps, that is, it should not only consist in deductive chains of statements. This assertion needs to be clarified, that is, and in what is possible in a letter without formulas, posed black over white.

For trying to do it, let's suppose reasoning consists in well managing the inferential relation 'follows forwards', starting from a finite number of non-contradictory premises resumed in their conjunction. What 'follows forwards' from such résumé are consequences: what makes the résumé 'follow forwards' from it, is a hypothesis, that also can be seen as if it 'follows backwards' from the résumé; of course, since the résumé follows forwards from the hypothesis, it can be said that it 'explains' the premises, that is, it makes them inferentially follow from the 'simpler' statement that is the hypothesis. Thus, it just lacks to consider what is not comparable with the résumé under the relations 'follow forwards' and 'follow backwards'; such a statement is a speculation. Hence, speculations are those statements inferentially isolated from the premises' résumé. That is, a speculation can neither be forwards, nor backwards, directly available by deductive chains linking with it the résumé.

In this way, reasoning can be classified in deductive, when conducting to consequences, abductive, when conducting to hypotheses, and speculative when conducting to speculations. Consequently, creative reasoning should be mainly seen inside the speculative reasoning.

Nevertheless, it is still possible to go a little bit further by inferentially comparing speculations with the negation of the premises' résumé. If it follows forwards from the speculation, it will just mean the speculation refutes the résumé of the premises. Avoiding this possibility, it only rests that it follows backwards from the speculation, and it is said to be of type-one (it can be backwards followed from the negation of the résumé), or that both are inferentially isolated, and it is said it is of type-two, or a truly creative speculation. In this case, any possible and indirect process conducting to the speculation can be called an inductive reasoning, that, obviously, can neither be totally conducted forwards, nor backwards, and neither from the résumé, nor from its negation. It does not mean, of course, that some (successive) deductive paths cannot exist by, first going forwards and after backwards, or reciprocally. Anyway, for having such possibility, it is at least necessary to know a 'part' of the speculation from which, for instance, it is followed forwards some statement from which, at its turn and backwards, the type-two speculation is reached. This is close to what is done in the AI's programs and is known as 'a heuristics'. Anyway, to reach creative, or type-two speculations, and in many situations, jumps seem to be unavoidable. Let me remark the big difference existing between deductively prove what is known (as in the mathematical texts it is first the statement/theorem, and immediately its proof), and capturing what, being still unknown, it may be found and, eventually, proven. Between learning and discovering there is a very big difference; the professor's enthusiasm is a good help for the student understanding of such important skill for research.

Anyway, the big and general difficulty on systematically founding combinations of forwards and backwards 'movements', is a part of what keeps creative speculations far from being algorithmically domesticated.

Notwithstanding, creative reasoning is not exiting from the empty, and apart from the starting information facilitated by the premises, it is need to count with a back-ground knowledge on the corresponding subject's context. Even in those cases in which a new discovering is reached, without counting with a neighborhood of knowledge on the context and containing consequences, falsifications, hypotheses, and former speculations, creative reasoning seems to be impossible. Perhaps, it suffices to think on the discovering of the benzene's molecular structure by August Kekulé. Who could have been going from the image of a snake eating its tail to such chemical structure, without having a lot of knowledge on the benzene?

Like Kekulé's creative discovering further boosted the very important German industry of colorants, any creation finally boosts something that, before, did not exist. Creation is a true engine of progress, be it cultural, artistic, or scientific, and the best reasoning is that fuelled by creative reasoning; that going further from the starting information.

I think that for mechanizing creative reasoning both the algorithmic problem, and the generation, storage, and retrieval of knowledge, are among the pending mysteries in the way towards the famous Leibniz's shout 'Calculemus!'

Were I asked on how to approach the algorithmic problem, I would remain silent, except for one thing I have for sure: Don't try to work within mathematical structures enjoying too much 'laws', but try to do it under the XIVth Century's methodological rule known as the Occam's Razor, 'never introduce more entities than those strictly necessary', but, without forgetting the XXth Century's addenda by Karl Menger, 'nor less than those presumable conducting to fertile results'.

Well, my dear Claudio, I beg you to see this letter as my humble, personal, even if virtual, homage to you. As you know very well, in Spain you count with many friends.

Let me end by wishing you a happy and healthy entrance in the course towards yours ninety years old. Would you live much more!

With my warmest feelings of friendship,

Yours, as always,

Enric.

SCIENTIFIC REPORT

20 Years of the Institute for Research and Applications of Fuzzy Modeling, the research institute of the University of Ostrava in the Czech Republic

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In September 1996 was established the Institute for Research and Applications of Fuzzy Modeling (IRAFM) as a new research institute of the University of Ostrava in Ostrava - the third largest town in the Czech Republic. This means that September 2016 is the month when this scientific place of work celebrates 20 years of its existence. So, it is a good reason to write few lines in which we look back at all these years. We evaluate this period as very successful. Existence of a place of work such as our institute is exception not only in Europe, but practically in the world. After closing the European Centre of Soft Computing in Spain, IRAFM remained the only institute in Europe that continues its work in the field of fuzzy modeling and soft computing.

From the very beginning, IRAFM was constituted as a scientific institute. This means that theoretical research was prevailing. But soon we realized that only theory is not sufficient and that we must focus also on applications. We took the following proclaim as the basic motto for our activities:

There is nothing more practical than a good theory

Kurt Lewin, 1951

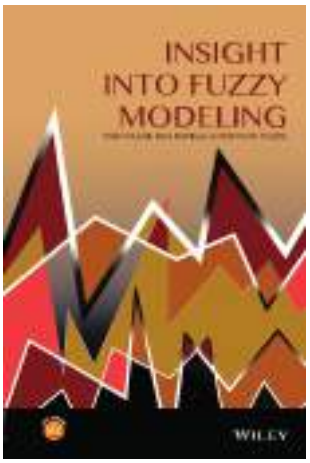
We truly believe that this motto is right. If one focuses either only on theory, or only on applications then the research becomes sooner or later degenerated. This is even more dangerous if we restrict ourselves on applications only because then the research quite soon starts treading water, repeats repeated and its progress becomes very limited. Simply, the source of new ideas comes mostly from the basic research that, however, should be adjusted by concrete problems formulated when working on applications.

During its 20 years of existence, IRAFM prepared over 1050 publications, of which are 470 papers in scientific journals (mostly with impact factor), 7 books, 57 chapters, 530 contributions in proceedings, 21 software systems and 1 patent. In the images, the books published in the years 1999-2017 are shown.

The institute started with 6 scientists. Up to 2006, this number was doubled. But then two milestones had essential impact on the future of IRAFM. The first milestone was awarding the state research plan MSM 6198898701 “Logical and algebraic methods for processing of information under uncertainty and their applications in fuzzy modeling” that

we received from the Ministry of Education of the Czech Republic. This project was the main source of our financing in the years 2005-2011. The second milestone was a large project of EU Operation programs “CZ.1.05/1.1.00/02.0070 Centre of Excellence IT4Innovations” that was approved for the years 2011-2015. On the basis of this project, the fourteenth largest supercomputer in the world was installed in Ostrava and IRAFM became member of the newly established National Supercomputing Centre. These two projects influenced the increase of the number of workers. While in 2010 we had already 22 scientific workers this number increased with the second project so that in 2015 we had 35 scientific workers. As the second project was also finished and we entered the period of sustainability, we decreased this number

to 30. Among them are 5 full professors, 4 associate professors and 15 PhDs. Besides scientific work, we also participate on education of students in bachelor and master courses and the professors are also supervisors of PhD students whose number is currently 6.



Let us emphasize that Ostrava has a long tradition in the study of fuzzy logic and fuzzy modeling. The results of people from this region, part of them now working in IRAFM, are internationally renowned. The workers of IRAFM have been presenting their results in international conferences and also giving invited lectures at universities in more than 35 countries in Europe, America, Australia, Asia and Africa. On the basis of this activity, we keep contacts with people from Japan, Korea, India, USA, China and in Europe with people from Belgium, Russia, Latvia, Spain, Poland, Germany, Slovakia and Austria. We also organized several international conferences, namely the International Fuzzy Systems Association World Congress IFSA'97 that took place in Prague in 1997, International Conference "The logic of soft computing" (2005, Ostrava), International Conference of the European Society for Fuzzy Logic and Technology EUSFLAT 2007 that took place in Ostrava, a series of International Student Conferences on Applications of Mathematics and Informatics ISCAMI that took place near Ostrava in 2012-2014 and 2016 and recently we also organized EUSFLAT Summer School on Fuzzy Logic and Applications SFLA 2016, on which more than 30 participants listened to lectures of several world renowned scientists.

The results of IRAFM have significantly contributed to the state of the art of the theory as well as methods of fuzzy modeling. In the theory, we significantly contributed to formal fuzzy logic and the related algebras. We founded the concept of Fuzzy Natural Logic - a formal theory of human reasoning that proceeds in natural language and, therefore, it employs a model of natural language semantics.

Another very important is the concept and theory of Fuzzy Transform (F-transform) - original and very powerful technique suggested by Irina Perfilieva. The F-transform has a lot of amazing applications and thus, it fully accomplishes the above motto.

Many other theoretical results contributed to the theory of t-norms, aggregation operators, non-classical integrals and special algebras. We also obtained interesting results in numerical solution of differential equations, theory of multicriteria decision-making, mining information from data and signal processing. In recent years we also obtained interesting results in the theory of dynamical systems.

Besides the theory, we also developed methods that have various kinds of applications. Among them, let us first mention image processing methods based on the F-transform. As mentioned this technique has many applications starting from image compression, image fusion, edge detection up to image inpainting (automatic correction of damaged images) and searching part of an image in a large database of images. We are also able to find and detect damaged letters in an image. Successful is the application running on mobile phone that makes it possible to follow and warn the driver if his/her car deviates from the lane.

The list of applications of the F-transform is still not finished. It can be very effectively used in signal processing where it makes it possible to reconstruct precisely a signal damaged by noise (this result generalizes the famous Nyquist-Shanon-Kotelnikov sampling theorem). Another group of applications of the F-transform is in time series analysis where it provides credible estimation of the trend or trend-cycle. When combined with methods based on fuzzy natural logic, we are able to provide effective forecasting as well as mine sophisticated information form time series and other kinds of data.

A specific result is the original conception of linguistically oriented fuzzy logic control. The effective algorithms make a feeling that computer "understands" natural language expressions. The associated software LFL Controller has been applied also in practice (the most successful is fuzzy control of 5 aluminium melting furnaces of the metallurgic plant Allinvest in Břidličná). This software, however, has wider applications and can be used also in multicriteria decision-making and elsewhere where expert knowledge is available.

This brief account of the results of IRAFM is by no means finished. The interested reader is referred to our web page

`http://irafm.osu.cz/`

We may conclude that IRAFM is now on the top. It is a big commitment for all of us. We are aware that to keep it, we must even increase our effort as otherwise it is very easy to fall down.

CONFERENCE REPORT

The 2nd International Symposium on Fuzzy Sets (ISFS 2015) "Golden Jubilee of Fuzzy Sets"

This scientific meeting took place at December 3-4. The symposium was organized by Faculty of Mathematics and Natural Sciences at University of Rzeszów and Polish Mathematical Society branch in Rzeszów on the occasion of the 50th anniversary of fuzzy sets.

The topic of symposium was fuzzy sets theory, its extensions and applications as well as related topics. The symposium was dedicated to Professor Józef Drewniak who celebrated this year his 70th anniversary. Professor Józef Drewniak is the one who gave rise and care to the group dealing with fuzzy sets and related topics at University of Rzeszów.

The venue of the symposium was the University of Rzeszów which is the biggest academic institution in Podkarpackie voivodeship situated in southeastern Poland. The first edition of the symposium took place in 2014, November 25^{th} with the subtitle "On the Eve of Golden Jubilee of Fuzzy Sets".

During the symposium we had 2 plenary lectures by Bernard De Baets and Radko Mesiar and 10 presentations. We had 17 registered participants (Bernard De Baets Radko Mesiar, Józef Drewniak, MichałBaczyński, Vladimír Janiš, Martin Kalina, Jana Špirková, Krzysztof Dyczkowski, Zofia Matusiewicz, Jolanta Sobera, Pavol Král, Gül Deniz Çayli, Ewa Rak, PawełDrygaś, Barbara Pękala, Anna Król, Urszula Bentkowska) and also other participants from the University of Rzeszw.

The members of the Scientific Committee who agreed to patronize the symposium were: MichałBaczyński, Humberto Bustince, Bernard De Baets, Józef Drewniak, Przemysław Grzegorzewski, Vladimír Janiš, Janusz Kacprzyk, Martin Kalina, Radko Mesiar, Susanne Saminger-Platz, Eulalia Szmidt, Maciej Wygralak, Sławomir Zadrożny, Lemnaouar Zedam.

We had fruitful and interesting discussions on the topic of symposium and we also were sightseeing the city including the Underground Tourist Route at the Rzeszów Market Square.

We are planning the next edition of symposium in May 2017.

The Organising Committe of ISFS 2015
Urszula Bentkowska, Paweł Drygaś, Anna Król, Barbara Pękala, Ewa Rak

CONFERENCE REPORT

FSTA 2016

It is exactly 25 years since the scientists in the field of uncertainty modeling started to meet each other every two years on FSTA international conferences. The international conference on Fuzzy Set Theory and Applications, FSTA 2016, was held in Liptovský Ján January 24-29, 2016 and it was already the 13^{th} issue of FSTA.

Maybe the tradition or maybe something else caused that the top level scientists on fuzzy set theory and applications from 15 countries from Japan to Brazil met on FSTA 2016. It is difficult to mention just some of the participants to gain the basic overview over the conference, because "FSTA is a must experience yourself conference", meant in the most positive sense. For some symbolic celebration of quarter of century conference the organizers awarded with a medal some of the scientists that influenced the FSTA 2016 and the previous FSTA's the most: Erich Peter Klement (AT), Radko Mesiar (SVK), Beloslav Riečan (SVK), Didier Dubois (FRA), Salvatore Greco (ITA), Vilém Novák (CZE), Michel Grabisch (FRA), Javier Montero (ESP), Piotr Jaworski (POL), Humberto Bustince (ESP).

FSTA 2016 is known also for its rich social program as trips, excursions, wellness, banquet with traditional folk music, but the highlight of the conference nonscientific program is for sure the Concert of participants. Excluded the last song of concert, where almost everyone in concert hall was singing, there were 15 conference participants performing on the concert. There have to be mentioned the description of the concert from one young Czech scientist's point of view: "It was probably the top of my scientific career, when I experienced a standing ovations with such a great scientists as Beloslav Riečan, Didier Dubois or Michel Grabisch".

Organization took place under the auspices of the Slovak University of Technology in Bratislava, the Armed Forces Academy of General Milan Rastislav Štefánik in Liptovský Mikuláš and SIPKES s.r.o.

We highly believe that the 13^{th} FSTA is just one part of the great tradition of the conference and we are looking forward to welcome many interested participants at FSTA 2018.

Ladislav Šipeky
Chair of the Organizing Committee

CONFERENCE REPORT

EUSFLAT Summer School SFLA 2016 - Report

The "European Summer School on Fuzzy Logic and Applications - SFLA 2016" was organized in Čeladná, Beskydy mountains, Czech Republic on August 14-19, 2016. It was the second year of the summer school organized under the auspicious of EUSFLAT. The event was supported by International Visegrad Fund through its Standard grant No. 21520043 and it is important to stress that we could have obtained this grant due to the support of 11 institutional partners[17] (Polish, Hungarian, Slovakian and Czech universities and institutes listed below Ű many thanks to their representatives!!!) of the collaborative project and due to the support letter from Gabriella Pasi, the EUSFLAT president. It would be hardly economically possible to organize the event in the given standards and for the given registration fees without such help. We have to be also very thankful for the support provided by 8 EUSFLAT travel grants that made possible the participation of EUSFLAT student members who mostly would not be able to find sufficient funds at their own universities.

As not many people are interested in long texts, allow me to summarize the event in items and pictures:

- 11 internationally recognized plenary speakers on both events together (Petr Cintula, Frank Klawonn, Rudolf Kruse, Vilém Novák, Henri Prade, Irina Perfilieva, Bernard De Baets, Vladik Kreinovich, Ulrich Bodenhofer, Libor Běhounek and Olga Kosheleva)
- 35 participants of the Summer School, (incl. accompanying persons and organizers)
- 12 short time visitors from local universities
- 58 is the total number of all participants
- 13 countries represented (Norway, Belgium, Spain, India, Switzerland, Slovakia, Netherlands, Germany, Austria, USA, France, Ukraine, China)
- 2 student sessions
- 1 open air theatre performance (Konstantinos and Methodius - a comedy with real historical story)
- 1 Christmas style gala dinner with carols, Christmas tree and presents for children (what else have never been done at any conference, what else to show people from distinct parts of the world to get them acquaint with our culture, what else could make people more relaxed in a friendly atmosphere, what else could be more surprising in the middle of summer, what else could children accompanying some of the participants love more)
- 1 trip to mountains (chairlift, landscape views, downhill scooters)
- 1000 fabulous memories
- New friendships (unmeasurable).

We loved it and we loved the view on faces of participants who, we believe, enjoyed it. SFLA (2016) is dead, long live the SFLA Ű we are already looking forward to SFLA 2017 in Santiago de Compostela, we are absolutely sure that this is going to be an outstanding event.

[17] AGH University of Science and Technology (Krakow, Poland), Systems Research Institute Polish Academy of Sciences (Warsaw, Poland), Óbuda University (Budapest, Hungary), Masaryk University (Brno, CZ), Institute of Computer Science of the Czech Academy of Sciences (Prague, CZ), Silesian University in Opava (Opava, CZ), Slovak University of Technology in Bratislava (Bratislava, Slovakia), Matej Bel University in Bánská Bystrica (Bánská Bystrica), Pavol Jozef Šafárik University in Košice (Košice, Slovakia), University of Silesia in Katowice (Katowice, Poland), University of Debrecen (Debrecen, Hungary)

CONFERENCE REPORT

FLINS2016 - Towards Decision Making In Big Data Environment

Xianyi Zeng[1], Jie Lu[2], Etienne E. Kerre[3], Luis Martinez[4], Ludovic Koehl[1]
[1]Ecole Nationale Supérieure des Arts et Industries Textiles, Roubaix, France
[2]University of Technology, Sydney, Australia
[3]University of Gent, Belgium
[4]University of Jaén, Spain

FLINS, an acronym originally for Fuzzy Logic and Intelligent Technologies in Nuclear Science, was launched in 1994 by Prof. Da Ruan in the Belgian Nuclear Research Center (SCK • CEN) aiming to give researchers the opportunity to carry out future-oriented research in fuzzy logic and its applications. For more than twenty years FLINS has been extended to include more theoretical and practical aspects of computational intelligent systems.

Reception by the mayor at City Hall

Held in Roubaix (France) and jointly organized and chaired by Profs. Xianyi Zeng, Jie Lu and Ludovic Koehl, FLINS2016 follows a successful conferences series: FLINS1994 and FLINS1996 in Mol, FLINS1998 in Antwerp, FLINS2000 in Bruges, FLINS2002 in Gent, FLINS2004 in Blankenberge, FLINS2006 in Genova, FLINS2008 in Madrid, FLINS2010 in Chengdu, FLINS2012 in Istanbul, and FLINS2014 in Joao Pessoa. Supervised by the FLINS Steering Committee, it is co-organized by the Ecole Nationale Supérieure des Arts et Industries Textiles (ENSAIT) and the GRAISyHM (research association in automation and human/machine systems in the North of France), and co-sponsored by the City Council of Roubaix and the Métropole Européenne de Lille. FLINS2016 offers a unique international forum to present and discuss newly-developed ideas, techniques and systems for fuzzy logic and uncertainty modelling in Knowledge Engineering and Decision Making.

As internationally reputed researcher, Prof. Da Ruan founded the FLINS conferences series and, through these conferences, created a worldwide and multidisciplinary consortium of research on computational intelligence. After his passing-away in 2011, his successors, including the organizers of FLINS2012, FLINS2014 and FLINS2016, have followed his values of opening, compatibility and innovation, and continued to consolidate and enlarge this research consortium by developing and presenting new theories and applications in related areas.

Jie Lu and Xianyi Zeng, Organizers of FLINS 2016

As previous conferences, FLINS2016 aims at providing an international forum that brings together researchers in mathematics, information science, and engineering, actively involved in decision making with uncertainty, intelligent systems, data analysis, and knowledge engineering, to report their latest innovations and developments, summarize the state-of-the-art, and exchange their ideas and progress. Moreover, three special contributions have been made during FLINS2016.

- We originally organized discussions in different forms (tutorial, keynote presentations, round table panel discussion) on concepts, theories and applications on big data and specially emphasized various decision-making systems in big data environment.

- More emphasis has been put on applications of computational intelligence to industries, especially on the

topics of common interests, such as human healthcare systems, sustainable development, logistics, supply chain and production optimization, evaluation systems and performance analysis, risk and security management, and fashion and textile engineering. A number of special sessions have been organized around these topics.

- A Doctorate Consortium has been organized so that PhD students could directly exchange with high-level experts on their research topics and related contexts.

Invited participants

During FLINS2016, four invited experts gave their keynote presentations. The four keynotesŠ talks include: 1) *Designing Fuzzy Systems for Big Data - Challenges and Opportunities*, by Francisco Herrera from University of Granada; 2) *Arts and Science - Illustrative Examples, Critical Analysis, and Future Opportunities*, by Christian Jacquemin from University of Paris-Sud; 3) *On Prognostics and Engineering Applications using Evolutionary Multi-objective Optimization*, by Kay Chen Tan from National University of Singapore; 4) *Can I make my neural and neuro-fuzzy systems a bit more useful?*, by Prof. Nikhil R Pal from Indian Statistical Institute.

Apart from the keynote presentations, 150 regular papers from 22 countries were orally presented in 42 parallel sessions. About 50% of these papers mainly focus on the new theoretical contributions on different topics, such as decision-making and fuzzy techniques, intelligent systems and data analysis with uncertainty, intelligent systems and knowledge engineering, logic and automated reasoning. The other papers present application-oriented contributions, including decision-making under uncertainty in health care systems, advanced computations for sustainable development, intelligent systems for logistics, supply chain and production optimization, multi-criteria evaluation application, soft computing in fashion design and textile production, risk and security analysis, image analysis, neural networks and dynamic systems.

The contributions of the nine special sessions are playing an important role in FLINS2016. These special sessions include the topics on Intuitionistic & Hesitant Fuzzy Multiple Criteria Decision Making, Logic and Automated Reasoning with Applications, Computational Intelligence and Applications, and so on. The Symposium of ISKE16: Intelligent Systems and Knowledge Engineering has also been organized in the frame of FLINS2016.

All the presented papers have been collected in the conference proceedings of FLINS2016, entitled *Uncertainty Modelling in Knowledge Engineering and Decision Making* and published by World Scientific Publisher.

After FLINS2016, a number of extended papers are being selected for publication at SCI indexed journals.

Experts of the Panel Discussion on Decision Making in Big Data Environment

NEWS

Prof. Januscz Kacprzyk awarded for Outstanding Contribution in the field of Computational Intelligence

(On behalf of the Entire Organization of) International Neural Network Society (INNS) India Regional Chapter & 2016 4th International Symposium on Computational and Business Intelligence (ISCBI 2016)

Prof. Januscz Kacprzyk has been the first East and Central European awardee, mainly for his works in the area of fuzzy logic.

Every discipline, especially in science & technology, comes into existence due to the path shown by the corresponding inventors. Computational Intelligence (CI) is no exception. It is blessed with its great founding fathers like Prof. Lotfi A. Zadeh, Prof. Bernard Widrow, Late Prof. John M. Holland etc. without whom the acronym CI would never have existed in the vocabulary of computer scientists. At the same time there has always been an urgent need to keep the momentum going. It calls for continued investigations in order to address numerous challenges posed by the very interesting but extremely complicated areas of CI. It is the set of pioneers who are responsible for continuously building fresh momentum and relentlessly advancing its state-of-the-art, leading to shedding new lights and unearthing new potential. Undoubtedly, Prof. Janusz Kacprzyk can surely be categorized as being one of the pioneers in the field of CI.

Prof. Kacprzyk is a Polish scientist and currently head of the Intelligent Systems Laboratory of the Systems Research Institute, Polish Academy of Sciences (SRI PAS), Warsaw, Poland. Truly a legend, he specializes in applications of fuzzy logic in decisions, optimization, control, data analysis and data mining in areas such as mobile robotics, ICT etc. He authored 5 books, (co)edited more than 80 volumes, (co)authored more than 500 publications. Hitherto his publications had been able to attract well above 19000 Google Scholar citations with an h-index of 64. He is the editor-in-chief of 6 book series (Springer) and of 2 journals, besides serving the editorial boards of 40 journals.

Currently he is also associated as a Professor/administrator of a no. of other organizations e.g. Warsaw School of Appied Information Technology and Management (WIT), (since 1998), Industrial Research Institute of Automation & Measurements (PIAP), Warsaw (since 2007), Director, Center of Information Technologies, WIT and SRI PAS (since 2012) and Honorary External Professor, Yli Normal University, P.R. of China (since 2006).

His depth of knowledge, breadth of perspective, and analytical approach has earned Janusz several fellowships from a no. of highly respected societies/institutions e.g.

- Fellow, MICAI/SMIA (Mexican Society for Artificial Intelligence), 2015
- Fellow, ECCAI (European Coordinating Committee of Artificial Intelligence), 2014
- Fellow, IEEE (Institute of Electrical and Electronics Engineers), 2006
- Fellow, IFSA (International Fuzzy Systems Association), 1997

In addition, in recognition of significance of his contributions to the discipline of fuzzy logic, Prof. Kacprzyk has been elected member/foreign member of an array of extremely prestigious national/international academies, such as:

- Member, European Academy of Sciences and Arts, since 2015
- Member, Academia Europaea (Informatics), since 2014
- Foreign member, Bulgarian Academy of Sciences, since 2013
- Full member, Polish Academy of Sciences, since 2010
- Foreign member, Spanish Royal Academy of Economic and Financial Sciences, since 2007

Prof. Kacrpzyk was past President of the IFSA (2009-2011) and is currently President of the Polish Operational and Systems Research Society. He is an elected member of the Adcom of the IEEE Computational Intelligence Society (CIS) and had served as a Distinguished Lecturer of the IEEE CIS. Besides these, Prof. Kacprzyk is Member of numerous departmental scientific councils, advisory Boards and various committees.

The list of his Pioneer and similar awards is indeed, impressive. A (very small) subset of those honors are:

- Medal of ECSC (European Centre of Soft Computing) for contributions to the establishment and activities of the ECSC, Mieres, Spain, 2015
- WAC (World Automation Congress), Lifetime Achievement Award in Soft Computing, 2014
- IFSA Award for outstanding academic contributions and life time achievement in the field of fuzzy systems, 2013
- Medal of the Polish Neural Network Society for exceptional contributions to the advancement of computational intelligence in Poland, 2010
- Diploma from the Union of Bulgarian Scientists for contributions to computer Science, 2009

- Pioneer Award for Outstanding Contributions to Granular Computing and Computing with Words, Silicon Valley Chapter of IEEE CIS, 2007

To summarize, the story of Janusz reinforces the dictum that success is the good fortune that originates from aspiration, desperation, perspiration & inspiration. Known for setting very high standards for himself, he never rests till he meets those targets. His great ideas and deep sense of commitments always inspire and generate co operation, confidence & creativity among his peers/students. Today he is one of the most respected & sought after scientists in the world of CI. The Executive Committee of INNS-India Regional Chapter had unanimously concluded that it is very fitting and appropriate to honor this legendary scientist who puts a premium on very high standards of scientific excellence. Accordingly, it is our proud privilege in bestowing this felicitation upon Prof. Janusz Kacprzyk as a token of our highest esteem for his outstanding contributions in the field of computational intelligence.

Rolf Dornberger
Honorary Chair, ISCBI16
Univ of Applied Sciences & arts
Northwestern Switzerland

Prof. Suash Deb
President INNS-India Regional Chapter &
General Chair, ISCBI16

NEWS

Ph.D. Thesis defended by Viktor Gál

Ghent University, Belgium

Viktor Gál defended his Ph.D. Thesis, entitled "Modality Classification & Organ Detection in Medical Imaging", on January 21, 2016. His advisors were Dr. Etienne E. Kerre and Dr. Mike Nachtegael, from Ghent University.

Visual information contained in images is a very important and rich source of knowledge, exploiting this information is indispensable for certain professions. Good examples are social media, satellite imagery for remote sensing and medical images for research and education. To use this information it is often necessary to be able to find a certain type of images, for example rivers on a satellite image or computer tomography of a certain body part. To be able to do this image classification or content based image retrieval is required.

Image classification determines the category of an image based on a variety of features. These features may be artificial, such as captions or other meta-data and they can be embedded in the visual data itself. Visual features can be as simple as the presence or dominance of a colour, or certain edges, or as complex as the presence of a deformable object at a random viewing angle or scale. Feature extraction transforms the pixel data from image space into feature-space, where (if the features are well chosen) finding the appropriate class of an image is a much more manageable task. For the best results an intelligent combination of several features (feature fusion) and machine learning algorithms are used.

One of the most active and important fields for automated image classification is medical imaging. Classifiers can be used to decide image modality i.e. the type of instrument it was taken with MRI, CT, X-ray etc. User-studies done on clinicians have indicated that modality is one of the most important filters that they would like to be able to limit their search by on medical image databases. Another important use is the detection or segmentation of a certain sub-part of the image to find out if it contains an organ and highlight it for further processing or examination.

Most state of the art classification methods are tailored to a certain data set and rely on features characteristic of the images within. This means they can achieve high levels of accuracy, but at the price of losing flexibility. In this thesis the problem is addressed by introducing general configurable frameworks for classification and segmentation tasks.

The overall intention is to lay out a set of well-defined steps for a process that is able to perform image classification on a wide range of image data sets. The steps themselves are customisable by the user to tailor the process to the given classification needs and the data set, but the user has to be given enough tools to be able to handle a variety of different sets such as hospital patient records, (medical) journal articles, etc. As a secondary goal, to facilitate further processing, a content based segmentation framework is to be created based on the same principles of flexibility.

To demonstrate the versatility and usefulness of the proposed frameworks, example applications are implemented on well-known, freely available data sets, so that fair comparison can be made to other works in the literature. As a practical approach the domain of medical image processing is chosen to implement and demonstrate the effectiveness of the proposed frameworks. Medical application is considered as it is an active and important research area in this domain, therefore good quality datasets, with real-world relevance are available and thus the produced results can be compared to existing ones from the literature. Since analysing medical images is a very important task in modern medicine, results of these investigations are of clear practical value which gives additional motivation to this work. It was decided to use a data set of mixed modality images for the modality classifier experiment and to perform organ segmentation as the demonstrative experiment for image segmentation.

To sum it up the goals of his thesis work are the following:

- Give an overview of the state of the art and background information on relevant techniques to introduce the concepts developed in the rest of the thesis.
- Describe a general, configurable framework for medical image modality classification.
- Introduce of a novel automatic image segmentation framework based on machine learning and deformable models.
- Demonstrate the viability of the proposed frameworks through examples taken from medical image data sets through example implementations, modality classification and organ segmentation.

Although the examples and specific implementations in the thesis are focused on medical use, the proposed frameworks are readily applicable to general image classification and segmentation problems, due to the flexibility of the components.

NEWS

Ph.D. Thesis defended by Gilles Moyse

Université Pierre et Marie Curie - LIP6, Paris, France

Our research is in the field of fuzzy linguistic summaries (FLS) that allow to generate natural language sentences to describe very large amounts of numerical data, providing concise and intelligible views of these data.

We first focus on the interpretability of FLS, crucial to provide end-users with an easily understandable text, but hard to achieve due to its linguistic form. Beyond existing works on that topic, based on the basic components of FLS, we propose a general approach for the interpretability of summaries, considering them globally as groups of sentences. We focus more specifically on their consistency. In order to guarantee it in the framework of standard fuzzy logic, we introduce a new model of oppositions between increasingly complex sentences. The model allows us to show that these consistency properties can be satisfied by selecting a specific negation approach. Moreover, based on this model, we design a 4-dimensional cube displaying all the possible oppositions between sentences in a FLS and show that it generalises several existing logical opposition structures.

We then consider the case of data in the form of numerical series and focus on linguistic summaries about their periodicity: the sentences we propose indicate the extent to which the series are periodic and offer an appropriate linguistic expression of their periods. The proposed extraction method, called DPE, standing for Detection of Periodic Events, splits the data in an adaptive manner and without any prior information, using tools from mathematical morphology. The segments are then exploited to compute the period and the periodicity, measuring the quality of the estimation and the extent to which the series is periodic. Lastly, DPE returns descriptive sentences of the form "Approximately every 2 hours, the customer arrival is important". Experiments with artificial and real data show the relevance of the proposed DPE method.

From an algorithmic point of view, we propose an incremental and efficient implementation of DPE, based on established update formulas. This implementation makes DPE scalable and allows it to process real-time streams of data.

We also present an extension of DPE based on the local periodicity concept, allowing the identification of local periodic subsequences in a numerical series, using an original statistical test. The method validated on artificial and real data returns natural language sentences that extract information of the form "Every two weeks during the first semester of the year, sales are high".

The thesis was defended on 19 July at Université Pierre et Marie Curie in Paris with the following jury:

- Janusz Kacprzyk: reviewer
- Trevor Martin: reviewer
- Bernadette Bouchon-Meunier: examiner
- Jean-Gabriel Ganascia: examiner
- Anne Laurent: examiner
- Adrien Revault dâĂŹAllonnes: examiner
- Marie-Jeanne Lesot: thesis director

Keywords:
Summaries, Natural Language Generation, Fuzzy logic, Big data, Time series, Periodicity, Local periodicity

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CALLS

ISCAMI 2017 - 18th International Student Conference on Applied Mathematics and Informatics

Malenovice (Czech Republic) 8-11 June 2017

It is already the 18th International Student Conference on Applied Mathematics and Informatics (ISCAMI) organized jointly by the Centre of Excellence IT4Innovations - Division of the University of Ostrava - Institute for Research and Applications of Fuzzy Modeling (IRAFM), by the Department of Mathematics of Faculty of Civil Engineering, Slovak University of Technology in Bratislava and newly also by the Czech Technical University in Prague.

Based on the successful experience from the previos five years, ISCAMI 2017 will be organized jointly with the 6th Summer School on Applied Mathematics and Informatics. This means that the programme will alter between sections with student contributions and blocks of tutorials given by invited leading researchers.

The conference will be organized again in Malenovice, a beautiful village situated on the root of the highest peak in Beskydy mountains near Ostrava on June 8 - 11, 2017, `http://www.malenovice.com/`.

We are happy and proud that the conference, as the only student conference, is marked as EUSFLAT endorsed event, for which we are grateful to EUSFLAT.

The main purpose of ISCAMI is to bring together young researchers and students and to give them an opportunity to present their achievements and ideas in the area of applied mathematics, informatics and various applications. Authors are invited to prepare short abstracts that will be published in Book of Abstracts equipped with ISBN.

The conference is considered to be a low cost conference with **the registraion fee 145 EUR.** The registration fee includes:

- accommodation,
- full board,
- coffee breaks
- social programme.

Moreover, we have applied for the Visegrad grant to support this event and if we succeed, the registration fee can be even reduced.

For further details, please visit: `http://irafm.osu.cz/iscami/` or contact the Organizing Committee: iscami@osu.cz .

CALLS

AGOP 2017 - 9th International Summer School on Aggregation Operators

University of Skövde (Sweden) 19-22 June 2017

Aggregation Operators

Aggregation Operators (AGOP) have been studied in the last 30 years from both theoretical and application point of view. They are powerful tools to combine and fuse information and they are used in many fields as e.g. multicriteria decision making, information fusion, knowledge based systems (including approximate reasoning, fuzzy systems), multiagent systems, measure theory, and economics.

AGOP

After past editions in Oviedo (2001), Alcalá de Henares (2003), Lugano (2005), Ghent (2007), Palma de Mallorca (2009), Benevento (2011), Pamplona (2013), and Katowice (2015), AGOP will take place in Skövde, Sweden in 2017.

Topics of Interest

Theoretical aspects:

Properties of aggregation functions
New form of aggregation functions
Copulas and triangular norms
Fuzzy measures and integrals
Aggregation in ordinal and nominal scales
Operators and connectives for fuzzy sets and logic
Data fusion methods

Applications:

Data science
Machine and statistical learning and data mining
Information privacy and security
Bibliometry
Multiagent systems
Decision making and decision theory
Bioinformatics
Information access
Approximate reasoning and soft computing
Economics and finance

Submission and Publication

Original technical contributions are sought. Accepted papers (of 6-12 pages) will be published in the series "Advances in intelligent systems and computing" by Springer.

Important Dates

Submission deadline: January, 6th 2017

Acceptance notification: March, 6th 2017 **Final version**: March, 15th 2017

Conference: June 19Ű22, 2017

`http://www.mdai.cat/agop2017`

CALLS

IFSA-SCIS 2017 - Joint 17th World Congress of International Fuzzy Systems Association and 9th International Conference on Soft Computing and Intelligent Systems

Otsu (Japan) 27-30 June 2017

IFSA-SCIS 2017 (Joint 17th World Congress of International Fuzzy Systems Association and 9th International Conference on Soft Computing and Intelligent Systems) is organized every two years with the focus of bringing together scientists working on Fuzzy Sets and Soft Computing methods. It also provides a forum for the exchange of ideas between participants all over the world. 2017 edition of IFSA-SCIS 2017 will take place in Otsu, Japan on 27th-30th June 2017.

The scope of this conference covers all aspects of theory and applications in fuzzy systems and soft computing:

Fuzzy Sets:

Fuzzy sets and fuzzy logic
Mathematical foundations of fuzzy sets and fuzzy logic
Fuzzy systems design and optimization
Fuzzy control and robotics
Fuzzy information processing
Fuzzy hardware and architectures
Fuzzy pattern recognition and classification
Fuzzy clustering and rule mining
Fuzzy databases
Fuzzy decision making
Fuzzy preference modelling
Type-2, interval-valued, intuitionistic, and hesitant fuzzy sets
Rough sets, imprecise probabilities, possibilities theory

Soft computing methods:

Ambient intelligence
Bayesian networks
Bio-inspired optimization
Computational intelligence
Cyber computing
Evolutionary computation
Granular computing
Graphical models
Information fusion
Machine learning
Multi-agent systems
Multivariate analysis
Neural networks
Optimisation
Probabilistic reasoning
Semantic web

Important Dates (Full Papers):

Paper Submission: January 15, 2017
Notification of Acceptance: March 31, 2017
Camera-ready Submission: April 30, 2017

Plenary Talks:

Prof. Humbero Bustince (Public University of Navarra): Pre-Aggregation Functions: Theory and Applications in Classification and Image Processing

Prof. Dan Ralescu (University of Cincinnati): Statistical Decision-Making in Mixed Models of Uncertainty

Prof. Hisao Shiizuka (Kogakuin University): Knowing Sensitivity and Intelligence from the Viewpoint of System and Design

Important Dates (Position Papers):

Paper Submission: March 15, 2017
Notification of Acceptance: April 20, 2017
Camera-ready Submission: April 30, 2017

CALLS

The Fourteenth European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty

Lugano (Switzerland) 10-14 July 2017

The biennial ECSQARU conferences constitute a major forum for advances in the theory and practice of reasoning under uncertainty. Contributions come from researchers interested in advancing the scientific knowledge and from practitioners using uncertainty techniques in real-world applications. The scope of the ECSQARU conferences encompasses fundamental issues, representation, inference, learning, and decision making in qualitative and numeric uncertainty paradigms. Previous ECSQARU events have been held in Marseille (1991), Granada (1993), Fribourg (1995), Bonn (1997), London (1999), Toulouse (2001), Aalborg (2003), Barcelona (2005), Hammamet (2007), Verona (2009), Belfast (2011), Utrecht (2013), and Compiègne (2015).

ECSQARU 2017 will be co-located with ISIPTA 17, the Tenth International Symposium on Imprecise Probability: Theories and Applications. The joint event will be held in Lugano (Switzerland), on July 10-14, 2017.

For ECSQARU 2017 we invite submissions of conference papers on topics which include but are not limited to:

Algorithms for uncertain inference
Applications of uncertain systems
Argumentation systems
Automated planning and acting under uncertainty
Belief functions
Belief revision & merging
Classification & clustering
Decision theory & decision graphs
Default reasoning
Description logics with uncertainty
Foundations of reasoning under uncertainty
Fuzzy sets & fuzzy logic
Game theory
Imprecise probabilities
Inconsistency handling
Information fusion
Learning for uncertainty formalisms
Logics for reasoning under uncertainty
Markov decision processes
Possibility theory & possibilistic logic
Preferences
Probabilistic graphical models
Probabilistic logics
Qualitative uncertainty models
Rough sets
Uncertainty & data

Invited Speakers

We are delighted of having the following invited speakers:

Leila Amgoud (IRIT, France)
Alessio Benavoli (IDSIA, Switzerland)
Jim Berger (Duke University, USA)
Didier Dubois (IRIT, France)
Eyke Hüllermeier (Paderborn University, Germany)

Proceedings and Submissions

In accordance with the previous conferences, the proceedings of ECSQARU 2017 will be published in the Springer Lecture Notes in Artificial Intelligence series. Authors are requested to prepare their conference papers in the LNCS/LNAI format. Submitted papers will be evaluated by peer reviews based on originality, significance, technical soundness, and clarity of exposition. Authors of accepted papers are expected to attend the conference to present their work. The instructions for submission and the author kit are available here: `http://ecsqaru.idsia.ch/submissions-ecsqaru/`.

Important Dates

Tuesday, February 21, 2017: Paper submission deadline
Tuesday, April 18, 2017: Author notification
Friday, April 28, 2017: Camera-ready copy due

IJAR Special Issue and Springer Young Research Award

Authors of selected papers will be invited to submit an extended version of their work to a special issue of the International Journal of Approximate Reasoning (IJAR). We also invite applications for the Springer Young Researcher Award. The prize, granted by Springer, will be awarded to one young researcher for excellent research in fields related to the ECSQARU scope. The award is open to Master students, PhD students and young post-doc researchers who have received their PhD in 2016 (or 2017). Applicants should have submitted a paper (not necessarily as first authors) to ECSQARU 2017. Applications should be received by the paper submission deadline (February 21, 2017).

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CALLS

The Tenth International Symposium on Imprecise Probability: Theories and Applications (ISIPTA 17)

Lugano (Switzerland) 10-14 July 2017

The ISIPTA conference is the primary international forum about theory and applications of imprecise probability. Imprecise probability is a generic term for the many mathematical and statistical models and methods, allowing us to measure chance or uncertainty without the restriction of sharp probabilities. The symposium is open to contributions on all aspects of imprecise probability.

ISIPTA 17 will be co-located with ECSQARU 2017, the Fourteenth European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty. The joint event will be held in Lugano (Switzerland), on July 10-14, 2017.

Invited Speakers

We are delighted of having the following invited speakers:

Leila Amgoud (IRIT, France)
Alessio Benavoli (IDSIA, Switzerland)
Jim Berger (Duke University, USA)
Didier Dubois (IRIT, France)
Eyke Hüllermeier (Paderborn University, Germany)

JMLR Proceedings and Submissions

For the first time, the ISIPTA 17 proceedings will be published in the Workshop and Conference proceedings series (`http://jmlr.csail.mit.edu/proceedings`) of the Journal of Machine Learning Research (JMLR). The instructions for submission and the author kit are available here: `http://isipta.idsia.ch/submissions-isipta/`. The page limit is 12 pages in the JMLR style. Each submission will be reviewed by three referees.

Important Dates

Tuesday, February 21, 2017: Paper submission deadline
Tuesday, April 18, 2017: Author notification
Friday, April 28, 2017: Camera-ready copy due

IJAR Special Issue and Young Research Award

Authors of selected papers will be invited to submit an extended version of their work to a special issue of the International Journal of Approximate Reasoning (IJAR). We also invite applications for the IJAR Young Researcher Award. The prize, granted by IJAR, will be awarded to one young researcher for excellent research in the area of imprecise probability. The award is open to Master students, PhD students and young post-doc researchers who have received their PhD in 2016 (or 2017). Applicants should have submitted a paper (not necessarily as first authors) to ISIPTA 17. Applications should be received by the paper submission deadline (February 21, 2017).